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⑤4発明の名称　重層軟質食品の押出成形装置

⑦1特　願　昭58－144169

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明　細　書

1．発明の名称

重層軟質食品の押出成形装置

2．特許請求の範囲

① 外層材供給ホッパー1，中間層材供給ホッパー2および芯層材供給ホッパー3とを備え，各層材を大径ノズル51，中径ノズル52および小径ノズル53を三重管の如く配設してなる押出ノズル5に対し各供給室又は管11・21および31を介して供給し，外層材P₁を大径ノズル51と中径ノズル52間より，中間層材P₂を中径ノズル52と小径ノズル53間より，芯層材P₃を小径ノズル53より同時に押出して三層棒状軟質生地材Pを押出成形する押出装置と；外周部全域に亘ってシリンダ状のクロッシンググループ41・41…を有すると共に一定間隔をもってカッティングエッジ41a・41a…が(等間隔)設けられた一対のキャタピラーベルトA・Bを，同キャタピラーベルトAのグループ41・41…とキャタピラーベルトBのグループ41・41…とが会合することによってパイプ状の横回室R・R…を縦列的に形成する如く左右に並立させて設置し，これらキャタピラーベルトAおよびBを，順方向へ循環的に連通運動させつつ横回室R・R…を形成しているグループ41・41…が同一速度で下方へ移動しているアウトプット（OUT）位置において分離されるように循環運動可能に構成してなる切断・横回装置とからなり；

前記キャタピラーベルトAとBとが対向するインプット（IN）位置上方には，軟質生地材Pを棒状に連続的に押出す押出ノズルSを臨ましめ，其処から押出されてくる棒状の軟質生地材Pを前記キャタピラーベルトA・Bのインプット（IN）に落込みつつ噛合するカッティングエッジ41a・41aとによって一定寸法に切断し，かくして切断された軟質生地材Pを横回室R・R…内に導入し同室壁を形成するグループ41・41…を順次的に連通運動させることによって球形に成形し，キャタ

ピラーベルトA・Bのアットプット（OUT）から送出するようにしたことを特徴とする三重層軟質食品の押出成形装置。

3．発明の詳細な説明

本発明は三重層軟質食品の成形装置に関するものである。

近年，食品形態の多様化が要望されているが，形態が複雑になる程機械化作業が難しく，製造コストが高くなる。そのため，一般に，新製品の開発の技術的難点となっている。特に，菓子業界では饅頭，大福餅，羽二重餅等包餡食品を製造しているが，いずれも殻に外皮で餡を包んだいわば二重層製品である。ところが，食品形態の多様化の影響を受け，餡自身を二重層にて形成し，新たな味覚を提供することにより，需要の増大を図らんとするが，軟質の餡自身で別種の軟質餡を包み，更にその上に粘着性の強い外皮をもって包餡する作業は想像を絶する複雑しい技術であり，到底機械化になじまないものとされていた。従って，三重包餡製品を大衆的需要に適合させるべく，多重多量生産多量販売が不可能で，わずかに手作りのものが提供されるにすぎない。

そこで，本発明者はかいる実現不能とされている三重包餡技術の自動化を達成すべく，鋭意研究の結果包餡技術に対する長年蓄積してきた研究開発を基盤として，三重包餡を含み，広く三重層をなす軟質食品の自動成形装置を完成するに至った。

即ち，本発明の装置は，芯層，中間層および外層を同時に押出すべく押出ノズルが一定の形態をもって会合させ，それによって三重層の棒状素材を押出成形し，更にそれを特有の切断・搬回手段で一定寸法毎に切断しつつ搬回して成形する構成を備えることを特徴とするものであり，以下，図面に基づいて詳細に説明する。

第1図は本発明を三重包餡機に適用したものを示す正面図で，筐体下の中央上部には外層供給ホッパー1，その左側には中間層供給ホッパー2，その右側には芯層供給ホッパー3を配設し，下方の一対のキャタピラーベルトA・Bを相対配置してなる切断搬回手段4に指向してる各ホッパー1・

2・3から供給される材料を三層棒状Fに押出す押出しノズル5を配置してなる。

該押出ノズル5は，大径ノズル51，中径ノズル52および小径ノズル53が三重管をなす如く配設されている（第2図参照）。即ち，大径ノズル51は上記外層材供給ホッパー1に一対のロールギア12・12からなる圧送手段を介して連通する縦型の押出室11の底部に螺合配設され，内面にすりばち状テーパ面 51aを有する。他方，中径ノズル52は中間層材供給ホッパー2に同じく一対のロールギアからなる圧送手段22を介して連通し，左側から上記縦型押出室11内に案内された中間層供給管21の先端部に螺合配設され，外面に上記大径ノズル51のテーパ面 51aに相応するテーパ面 52aを有する。更に，小径ノズル53は芯層材供給ホッパー3に同じく一対のロールギアからなる圧送手段32を介して連通し，右側から上記中間層供給管31の中央に案内されて配管された芯材供給管31の先端部に螺合配設され，外面にテーパ面 53aを有する。

従って，外層材F1は圧送手段12により押出室11からテーパ面 51aと 52aの間を通って押出されるが，同時に中間層材F2も圧送手段22により供給管21からテーパ面 52aと 53aの間を通って，芯層材F3が圧送手段32により供給管31からノズル53内を通って押出されるので，押出ノズル5からは外層材F1，中間層材F2および芯層材F3が三重層をなし棒状に押出されることになる（第2図参照）。

ここで，各層の押出速度は等速となるように調節されるべきであり，適当な調整手段を上記押出室11，供給管21・31に付設するのが好ましい。従って，各層比率は各ノズル51～53の相対径をもって決定するように取換えるようにするのがよい。

上記棒状押出品Fは次いで，第3図に示すような一対のキャタピラーベルトA・Bからなる切断搬回手段によって適当寸法毎に寸断されて丸められる。即ち，第3図に示されるキャタピラーベルトA・Bは，グループ構成片41・41…とこれら構成片をエンドレス状に列設せしめるチェーン42・42とから構成されており，それぞれ上下一対のス

プロケット43・44および45・46に仕掛けられてある。第1図のものにあっては，下段側にドライビングスプロケット44・46，上段側にフォーロッスプロケット43・45が配置してあり，フォーロッスプロケット43・45は揺動リンクL1・L2によって起伏自在に支持されている。なお，47はスプライン軸，48は進退杆である。

他方，グループ構成片41，断面が略5角形状をなして底面がチェーン42に結合されている。このグループ構成片41はその頂破部がカッティングエッジ41aとなっており，このカッティングエッジ41aを挟む両辺には四分円状のクロッシンググループが形成されている，

従って，外周部全域に亘ってシリンダ状のクロッシンググループ41・41…を有すると共に一定間隔をもってカッティングエッジ41a・41a…が設けられた一対のキャタピラーベルトA，Bが全体することによってパイプ状の被包室R・R…を線列的に形成し，これらキャタピラーベルトAおよびBを，幅方向へ線速的に進退運動させつつ被包

室R・R…を形成しているグループ41・41…が同一速度で下方へ移動してアウトプット（ＯＵＴ）位置において分離されるように循環運動させることにより，上記押出されてくる棒状の軟質生地材Fを前記キャタピラーベルトA・Bのインプット（ＩＮ）に落込みつつ，噛合するカッティングエッジ41aと41aとによって一定寸法に切断し，かくして切断された軟質生地材Fを被包室R・R…内に導入し同室壁を形成するグループ41・41…を線速的に進退運動させることによって球形に成形し，キャタピラーベルトのアウトプット（ＯＵＴ）から送出すことになる。

なお，図面において，5・6は打粉ホッパーで，打粉コンベアベルト7・7を介して押出ノズル5から押出される被覆生地材F表面に打粉を施すことができるようになっており，また，8はキャタピラーベルトA・Bのクロッシンググループ41・41…内面に接触して潤滑を施すブラッシである。

上記本発明装置によれば，第4図に示すように芯層F_1を中間層F_2で包み，更にそれを外層F_3

で包んだ三重層製品が機械的に連続的に量産可能になるのであって，コストダウンによる経済的メリットは勿論のこと，人手に触れることなく製造できるところから雑菌の混入も防止できて日保ちの良い製品を衛生的に提供できるといった効用も併有するものである。

また，外層F_3，中間層F_2，および芯層F_1は任意に選択することができるので，手に触れることにより溶けやすいアイスクリームを中間層F_2とし，芯層F_1に餡，外層に冷菓用外皮を用いて新規な冷菓を提供できるだけでなく，芯層にタラコ，カニ身等固形物，中間層にチーズ，寒天等外層としては適当でないが風味向上に役立つ軟質材，外層に練製品を用いて新たな食品形態を創造することができる。

以上，本発明を具体例に基づいて説明したが，本発明の要旨を逸脱することなく，種々変形可能である。

例えば，実施例では三重層製品を形成したが，更に芯層F_1内に核層を形成したい場合は，別途核層材供給ホッパーを設け，芯層材供給管31内に核層材供給管を配設し，小径ノズル53より小なる核ノズルから核層を同時に押出すようにすればよい。

また，押出ノズル5は押出室11に線列配置され，一度に2以上の被覆棒材Fを同時に押出すようにすることもできる。一般にグループ構成片41は比較的長い被包室Rを形成するように長尺をなすので，2以上の棒材Fが同時に押出されても支障なく成形することができる。

更に，実施例では三重包装機として使用されるため，打粉を施す手段が付設されているが，他の三重層製品にとっても必ず必要なものでない。この場合，グループ構成片41の材料は外層が付着しないようにプラスチック材又はテフロン（登録商標）コーテング材が用いられてもよい。

なお，三層材の種類によってはなるべく早く押出された生地材をクロッシンググループによって把むのが好ましい場合がある。その場合，一対のキャタピラーベルトA・Bの（ＩＮ）側における

接近度合には限度があるので，第５図に示すように上方スプロケット43・45を下方スプロケット44・46よりも小径となし，クロッシンググループの内方への合合速度を早くするのがよい。

４．図面の簡単な説明

第１図は本発明にかいる三重包絡機の全体を示す正面図，第２図は本発明装置で用いる押出ノズル内部を示す断面図，第３図は本発明装置で用いる切断・接団装置の側面図，第４図は本発明装置で製造される三重層材菓子の断面図である，第５図は第３図の切断・接団装置の他の実施例を示す側面図である。

１…外層材供給ホッパー，
２…中間層材供給ホッパー，
３…芯層材供給ホッパー，４…切断・接団手段，
５…押出ノズル，

特許出願人

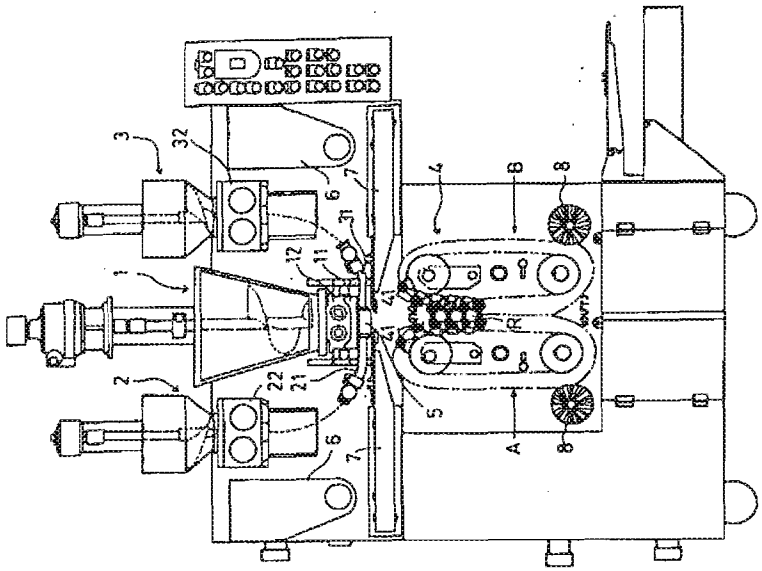
小　林　得　男

代　理　人

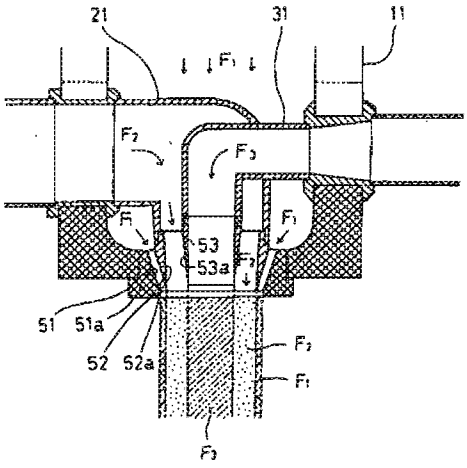
弁理士　戸　川　公　二

１１

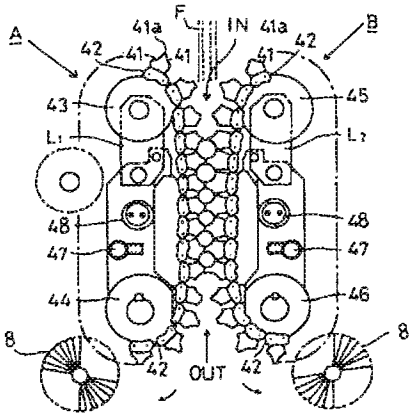
第１図



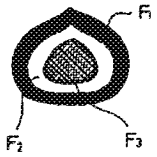
第2図



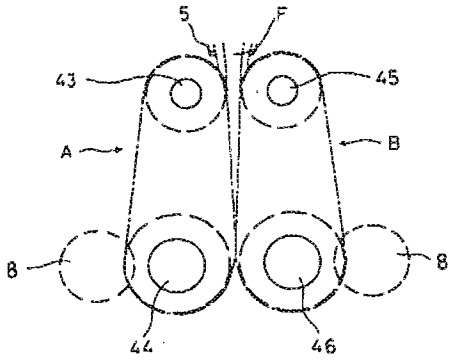
第3図



第4図



第5図



EXTRUSION MOLDING APPARATUS OF LAYERED SOFT FOOD

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Publication date: 1985-04-20
Inventor: KOBAYASHI MASAO
Applicant: KOBAYASHI MASAO
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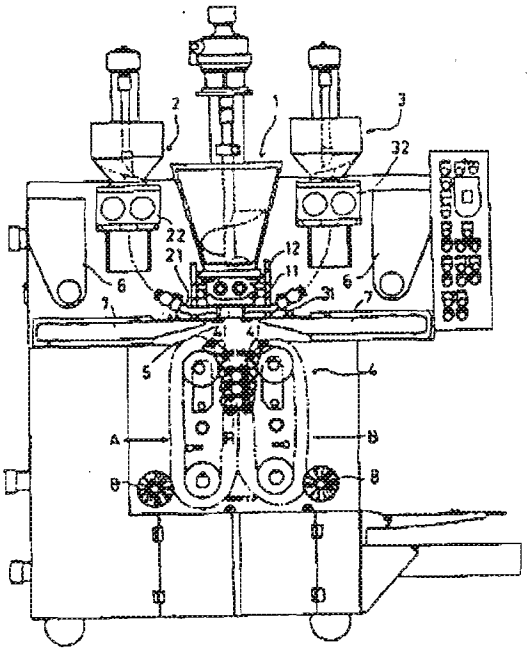
- european:
Application number: JP19830144169 19830805
Priority number(s): JP19830144169 19830805

Abstract of **JP60070036**

*PURPOSE:To produce efficiently a three-*layered soft food, by extruding a core layer, interlayer, and outer layer at the same time to mold a three-layered cylindrical material, rolling the material while cut into a given size in a unique cutting and rolling means, and molding the material. CONSTITUTION:An extrusion molding apparatus having an extrusion device, equipped with an outer material feed hopper 1, an interlayer material fed hopper 2 and a core layer feed hopper 3 for feeding the layers through pipes 11, 21 and 31 to an extrusion nozzle 5 provided in the form of a triple pipe and extruding layers *through the triple pipe at the same time to* mold a three-layered cylindrical soft dough material, and cutting the extruded dough material into a given size with cutting edges, dropped in an input (IN) of caterpillar belts (A) and (B), and meshing with each other, introducing the cut dough material into rolling chambers (R)- and molding the dough material with groups 41-, forming the chamber walls, and passing by each other to advance and retreat, and delivering the resultant spherical molded material from the output (OUT) of the belts (A) and (B). Thus, the layered soft food can be efficiently produced.



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Request for Examination: Submitted
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(54) Extrusion Molding Apparatus of Layered Soft Food

(21) Application Filing No. S58-144169
(22) Application Filing Date August 5, 1983

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SPECIFICATION

1. Title of the Invention

Extrusion Molding Apparatus of Layered Soft Food

2. Claims

(1) Extrusion molding apparatus of layered soft food, comprising an extrusion device for the extrusion molding of a three-layered rod-shaped soft dough material ***F***, being equipped with an outer layer material feed hopper ***1***, an intermediate layer material feed hopper ***2***, and a core layer material feed hopper ***3***, for feeding each layer material via the respective feed chambers or tubes ***11*** and ***21*** to an extrusion nozzle ***5*** with a large-diameter nozzle ***51***, a medium-diameter nozzle ***52***, and a small-diameter nozzle ***53***, disposed like a triple pipe, and simultaneously extruding an outer layer material F_1 from between the large-diameter nozzle ***51*** and the medium-diameter nozzle ***52***, an intermediate layer material F_2 from between the medium-diameter nozzle ***52*** and the small-diameter nozzle ***53***, and a core layer material F_3 from the small-diameter nozzle ***53***; and a cutting/rolling device provided with a pair of caterpillar (registered trademark) belts ***A*** and ***B*** possessing cylinder-shaped crossing groups ***41, 41...*** that cover the entire circumferential area and provided with cutting edges ***41a, 41a...*** at specified intervals, and placed so as to line up on the right and left to vertically form pipe-shaped rolling chambers ***R, R...*** due to the meshing of groups ***41, 41...*** of the caterpillar belt ***A*** with groups ***41, 41...*** of the caterpillar belt ***B***, and constructed to be capable of circulating motion so that these caterpillar belts ***A*** and ***B*** are caused to pass by each other moving downward while the groups ***41, 41...*** which form rolling chambers ***R, R...*** move downward at the same speed, and are separated at the output (OUT) position;
and characterized in that at the top position input (IN) where said caterpillar belts ***A*** and ***B*** face each other, is positioned the extrusion nozzle ***5*** which continuously extrudes the soft dough material ***F*** in a rod shape, and the rod-shaped soft dough material ***F*** that is extruded therefrom drops into the input (IN) of the caterpillar belts ***A*** and ***B***, while being cut to the specified dimensions by the meshing cutting edges ***41a, 41a***, and the thusly cut soft dough material ***F*** is introduced into the rolling chambers ***R, R...***, and is formed into spheres due to the fact that the groups ***41, 41...*** that form the walls of said chambers are caused to move, passing by each other, and is then discharged from the output (OUT) of the caterpillar belts ***A*** and ***B***.

3. Detailed Description of the Invention

The present invention relates to a molding apparatus of three-layered soft food.

In recent years, there has been a demand for a greater variety of food shapes, and as the shapes become more complex, the machining operations become more difficult, and the cost of production increases. This leads to technical difficulties in the development of new products. In particular, wrapped *an* [bean jam] food products such as *manju* [bun with bean jam filling], *daifuku mochi* [rice cake filled with bean jam], *habutae mochi* ["folded silk" rice cake], and the like, are now being produced in the confectionery industry, and in each case, these are what are known as two-layered products in which the *an* [bean jam] is simply wrapped with an outer skin. On the other hand, due to the influence of greater variety in food shapes, there is now a desire to increase demand by offering new flavors by forming the *an* [bean jam] itself into two layers. However, the operation of wrapping the soft *an* [bean jam] itself with another type of soft *an* [bean jam], and then wrapping that with a strongly adhesive outer layer is an unimaginably difficult technology, and has been considered something unsuited to complete mechanization. Consequently, since mass production and large-volume sales are unable to satisfy the requirements of the mass demand for three-layered wrapped *an* [bean jam] products, only a small number of hand-made products have been offered.

Accordingly, as a result of careful research based on long years of cumulative research and development regarding *an* [bean jam] wrapping technology, so as to achieve the automation of a three-layered *an* [bean jam] wrapping technology which had been considered impossible to accomplish, the present inventors achieved an automated molding apparatus of layered soft food that broadly forms three layers, including three-layered wrapped *an* [bean jam].

That is to say, the apparatus of the present invention is characterized in being provided with a constitution such that an extrusion nozzle for simultaneously extruding a core layer, an intermediate layer, and an outer layer is arranged with a specified shape, so as to form a three-layered rod-shaped material by extrusion molding, which is then cut to each specified dimension by a cutting/rolling means, and this is described in detail below on the basis of the drawings.

FIG. 1 is a frontal view showing the present invention as applied to a three-layered *an* [bean jam] wrapping machine. On the center top of a load platform ***T*** are arranged an outer layer feed hopper ***1***, to the left thereof an intermediate layer feed hopper ***2***, and to the right thereof a core layer feed hopper ***3***, and an extrusion nozzle ***5*** that extrudes the materials fed from each respective hopper ***1***, ***2***, and ***3*** to form a three-layered rod-shape ***F***

and directing it toward a cutting/rolling means *4* formed by arranging a vertical pair of caterpillar belts *A* and *B* to face each other.

Said extrusion nozzle *5* is arranged so that a large-diameter nozzle *51*, a medium-diameter nozzle *52*, and a small-diameter nozzle *53* are disposed like a triple pipe (see FIG. 2). That is to say, the large-diameter nozzle *51* is arranged to be screwed onto the bottom of a box-shaped extrusion chamber *11* that communicates to the outer layer material feed hopper *1* via a compression-feed means from a pair of roller gears *12, 12*, and possesses a conical tapered surface *51a* on the inside surface. On the other hand, the medium-diameter nozzle *52* is arranged to be screwed onto the front end of an intermediate layer feed tube *21* guided into said box-shaped extrusion chamber *11* from the left side, communicating to the intermediate layer material feed hopper *2* via a compression-feed means *22* likewise formed from a pair of roller gears, and possesses on the outside surface a tapered surface *52a* corresponding to the tapered surface *51a* of the large-diameter nozzle *51*. Moreover, the small-diameter nozzle *53* is arranged to be screwed to the front end of a core material feed tube *31* arranged to be guided to the center of the intermediate layer feed tube *31* [*sic*] from the right side, communicating to the core layer material feed hopper *3* via a compression-feed means *32* likewise formed from a pair of roller gears, and possesses a tapered surface *53a* on the outside surface.

Therefore, an outer layer material F_1 is extruded from the extrusion chamber *11* to pass between the tapered surfaces *51* and *52* due to the compression-feed means *12* [*sic*], but at the same time, an intermediate layer material F_2 is also extruded from the feed tube *21* between the tapered surfaces *52a* and *53a* due to the compression-feed means *22*, and the core layer material F_3 is extruded through the nozzle *53* from the feed tube *31* due to the compression-feed means *32*, so that the outer layer material F_1, the intermediate layer material F_2, and the core layer material F_3 are extruded in a rod-shape to form three layers.

Here, the extrusion speed of the various layers must be adjusted so as to be equal, and it is advantageous to attach a suitable adjustment means to the extrusion chamber *11*, and to the feed tubes *21* and *31*. Thus, it is desirable to change the ratio of the various layers so as to determine the relative diameters of the nozzles *51-53*.

Next, the rod-shaped extrusion product *F* is cut to each suitable dimension by a cutting/rolling means formed from a pair of caterpillar belts *A* and *B* and formed into a sphere as shown in FIG. 3. That is to say, the caterpillar belts *A* and *B* shown in FIG. 3 are formed from group-structural pieces *41, 41...* and chain pieces *42, 42* that cause these structural pieces to form an endless series, and are installed on the respective upper and lower pairs of sprockets *43, 44* and *45, 46*. In the apparatus of FIG. 1, the driving sprockets *44, 46* are positioned on the lower level, and the follower sprockets *43, 45* are

positioned on the upper level, and the follower sprockets *43*, *45* are supported by oscillating links *L1*, *L2* to drop freely. It should be noted that *47* is a spline shaft and *48* is a moving lever.

At the same time, the group-structural piece *41* forms an almost pentagonal cross section and its bottom surface is joined to the chain *42*. This group-structural piece *41* is such that the top thereof forms a cutting edge *41a*, and on the two sides that abut this cutting edge *41a* is formed a quadrant-shaped crossing group.

Therefore, due to the meshing of the pair of caterpillar belts *A* and *B*, which possess the cylinder-shaped crossing groups *41*, *41*... that cover the entire circumferential area and are provided with the cutting edges *41a*, *41a*... at constant intervals, pipe-shaped rolling chambers *R*, *R*... are formed in a column, and due to the fact that these caterpillar belts *A* and *B* are caused to move in a loop so that the groups *41*, *41*... that are caused to move so as to pass by each other laterally form the rolling chamber *R*, *R*... move downward at the same speed and separate at the output (OUT) position, and when the extruded rod-shaped soft dough material *F* drops into the input (IN) of the caterpillar belts *A* and *B*, it is cut to the specified dimensions by the cutting edges *41a* and *41a* which mesh with each other, and the thusly cut soft dough material *F* is introduced into the rolling chambers *R*, *R*..., and is formed into spheres due to the fact that the groups *41*, *41*... that form the walls of said chambers are caused to move, passing by each other, and is then discharged from the output (OUT) of the caterpillar belts.

It should be noted that in the drawing, *6*, *6* are dusting powder hoppers, which make it possible to apply dusting powder to the surface of the layered dough material *F* extruded from the extrusion nozzle *5*, via dusting powder conveyor belts *7*, *7*, and *8* is a brush for cleaning [*illegible*] the inner surface of the crossing groups *41*, *41*... of the caterpillar belts *A* and *B*.

As shown in FIG. 4, in accordance with the present invention apparatus, the core layer F_3 is wrapped with the intermediate layer F_2, and moreover, this is wrapped with the outer layer F_1, making it possible to mechanically and continually mass produce a three-layered product, which of course has the cost advantage of reducing the manufacturing cost, and also has the further advantageous effect of making it possible to offer a hygienic product with good shelf life, and making it possible to prevent contamination by microorganisms, due to the fact that manufacture can be accomplished without contact with human hands.

Furthermore, since the outer layer F_1, the intermediate layer F_2, and the core layer F_3 can be selected as desired, not only is it possible to provide a novel frozen confection using an outer skin for frozen confections as the outer layer, and with ice cream, which

readily melts at the touch of a hand, as the intermediate layer F_2, and with *an* [bean jam] in the core layer F_1, but it is also possible to create new food configurations, by using solids such as *tarako* [cod roe], *kanimi* [raw crab meat], or the like, in the core layer; cheese in the intermediate layer; and *kanten* [agar-agar gelatin processed from the red seaweed *tengusa* "heavenly grass"], or the like, a soft material would serve to enhance the flavor, though it would not be appropriate as the outer layer, but in the alternative, a rolled product could be used in the outer layer.

The foregoing is a description based on a specific example of the present invention, but various modifications are possible, as long as they do not deviate from the gist of the invention.

For example, in a working example wherein a three-layered product is formed, in cases where one wishes to also form a nucleus layer within the core layer F_3, this may be accomplished by providing a separate nucleus layer material feed hopper, and by disposing a nucleus layer material feed tube within the core layer feed tube ***31***, and simultaneously extruding a nucleus layer from a nucleus nozzle that is smaller than the small-diameter nozzle ***53***.

Furthermore, it is also possible for the extrusion nozzle ***5*** to be arranged vertically in the extrusion chamber ***11***, so as to simultaneously extrude two or more layered rod materials ***F*** at one time. Generally speaking, since the group-structural piece ***41*** is formed to be lengthy so as to form the relatively long rolling chamber ***R***, this makes it possible to simultaneously extrude two or more rod materials ***F*** without any impediment.

Moreover, a means for carrying out powder dusting is installed in order for [this apparatus] to be used as a three-layered *an* [bean jam] wrapping machine, but this is not necessarily required for other three-layered products. In this case, a plastic material or a Teflon (registered trademark) coating may be used so that material from the group-structural piece ***41*** does not adhere to the outer layer.

It should be noted that there are cases in which it is desirable to wrap extruded dough as quickly as possible, depending on the type of three-layered material. In such cases, it is advantageous to form the upper sprockets ***43*** and ***45*** with a smaller diameter than the lower sprockets ***44*** and ***46***, as shown in FIG. 5, so as to increase the speed at which meshing takes place toward the inside of the crossing group, since there is a limit to the degree to which they can approach the side of the pair of caterpillar belts ***A*** and ***B*** (IN).

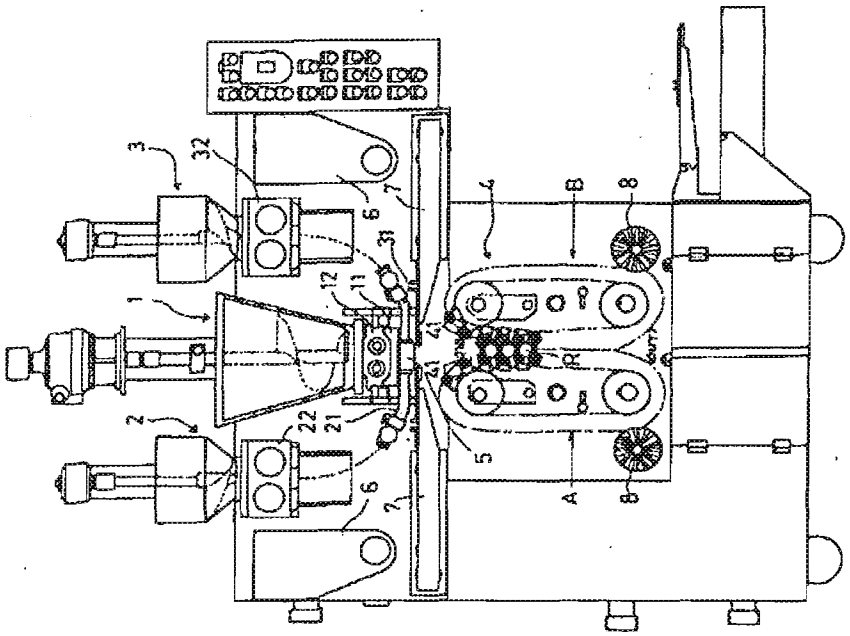
4. Brief Description of the Drawings

FIG. 1 is a frontal view of the entirety of a three-layered *an* [bean jam] wrapping machine of the present invention. FIG. 2 is a sectional view of the inside of an extrusion nozzle used in a present invention apparatus. FIG. 3 is a lateral view of a cutting/rolling device used in a present invention apparatus. FIG. 4 is a sectional view of a three-layered *an* [bean jam] confection manufactured with a present invention apparatus. FIG. 5 is a lateral view of another working example of the cutting/rolling device of FIG. 3.

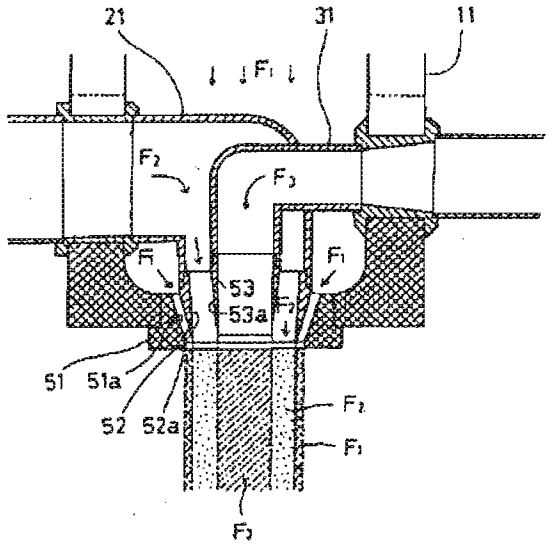
1 ... Outer layer material feed hopper
2 ... Intermediate layer material feed hopper
3 ... Core layer material feed hopper
4 ... Cutting/rolling means
5 ... Extrusion nozzle

Applicant Masao KOBAYASHI
Agent Koji TOGAWA, Japanese Patent Attorney

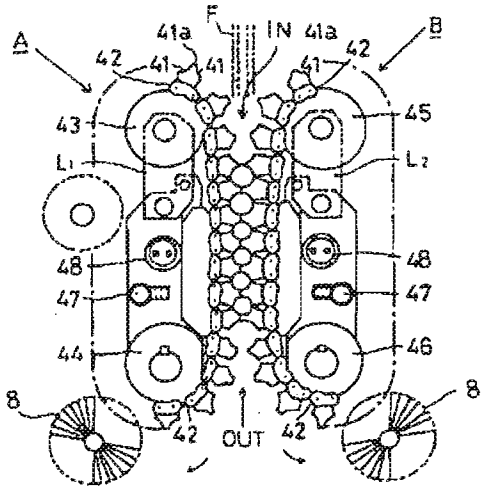
[FIG. 1]



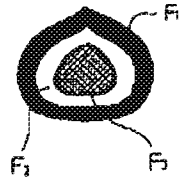
[FIG. 2]


21
31
11
F1
F2
F3
F1
F1
53
53a
F2
51
51a
52
52a
F2
F1
F3

[FIG. 3]


A
B
F
IN
41a
41a
42
41
41
41
42
43
45
L1
L2
48
48
47
47
44
46
8
8
42
OUT
42

[FIG. 4]



[FIG. 5]